魚類學雜誌

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Notes on the Bottom-fishes Obtained at Offshores of Niigata and Yamagata Prefectures, with Descriptions of Five New Species

Masamitsu OSHIMA, M. A.; D. Sc.

Bottom fishes living at the offshores of the coast of Japan Sea region are little known, due to the facts of continuous stormy weather preventing fishing procedures when activity of engined bottom trawlers is favoured at the Pacific sides and adjacent waters. Moreover, most of the fishes inhabit the deep of Japan Sea are not valued as food belonging to the families *Cottidae, Cyclopteridae, Liparididae* and *Zoarcidae, etc.* Consequently, extensive collection of deep sea fishes has not been made yet, systematic and ecological studies of these fishes remaining in somewhat dubious conditions.

Very fortunately, however, the writer had a chance to visit the Fisheries Experiment Station of Yamagata Prefecture at Kamo as well as Japan Sea Regional Fisheries Laboratory in Niigata quite recently and was able to study one part of the collections of rare bottom fishes contained in the museum of these institutions. In the following is given the record of the specimens examined, of which five seem to be new to science.

Acknowledgements are due to Mr. Kinjiro ITO, the Director of the Fisheries Experiment Station at Kamo and Dr. Kiyoshi UCHIHASHI, Director of Japan Sea Regional Fisheries Laboratory, by whose generousity the writer was able to study interesting specimens. For informations regarding trawling experiments extensively done to discover new fishing grounds in the vicinity of Sado Island last year and for permission to examine rare specimens obtained, the writer is especially grateful to his reliable colleague Mr. Genji KATO, Chief of the Biological Research Section of Japan Sea Regional Fisheries Laboratory. In addition, the writer should like to express his appreciation particularly to Dr. Kiyomatsu MATSUBARA of Kyoto University as well as Mr. Tatsuji UENO of the Freshwater Fisheries Research Laboratory in Tokyo, by whose assistance exact identification of certain dubious species has been made.

Family *Scorpaenidae*

Genus *Inimicus* JORDAN & STARKS

1. *Inimicus japonicus* (CUVIER & VALENCIENNES)
Oni-okoze.

Distrib.-South to central part of Japan proper; off Niigata and Kamo.

Family *Cottidae*

Genus *Gymnocanthus* SWAINSON

2. *Gymnocanthus herzensteini* JORDAN & STARKS
Tsumaguro-kajika.

Distrib.-Aniwa Bay to southern part of Japan Sea including Hakodate, Genzan; off Kamo.

Genus *Icelus* KRØYER

3. *Icelus spiniger* GILBERT
Kōri-kajika.

Distrib. –Unalaska; Bristol Bay; Aniwa Bay to northern part of Japan Sea; off Niigata and Kamo.

Genus *Dasycottus* BEAN

4. *Dasycottus setiger* BEAN
Ganko.

Distrib. –Alaska; Hokkaido to Toyama Bay; off Niigata and Kamo.

Genus *Zesticelus* JORDAN & EVERMAN

5. *Zesticelus japonicus* (new species)
Nihon-sokokajika (new name).

Head 2.50 in length; depth 5.63; snout 4.05 in head; eye 5; interorbital space 2; depth of caudal peduncle 3.00; D. VI–11; A. 10; P. 18; V. 3.

Head and anterior part of body depressed, tapering posteriorly, ending in narrow and slender caudal peduncle; head conical; snout short, tip obtusely pointed; eye large, superior; interorbital space narrow, shallow longitudinal groove runs from the tip of snout running through the interorbital space; nostril nearer to tip of snout than eye, with no nasal spine; mouth slightly oblique, lower jaw more or less produced than the upper, its angle reaching to a vertical through anterior border of orbit; vomer and palatines toothed; head entirely naked, occiput provided with indistinct osseous ridges; preopercular spines 4, the uppermost one enormously large and curved, the rest minute and subequal in size, the lowermost directed forwards; opercular spine rather weak, triangular, situated at the upper angle; muciferous system much developed, opening by wide pores along the lower jaw, the infraorbital ring, and the lateral line; on the occiput just behind the eyes openings of mucous cavity arranged circularly; gill-membrane connected, but free from isthmus, forming a broad fold across it.

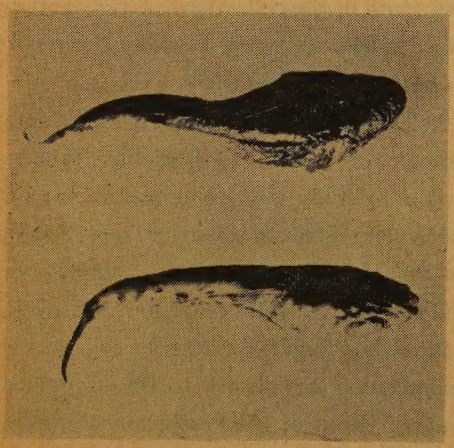

Fig. 1. *Zesticelus japonicus* Oshima
a. Lateral view.
b. Dorasal view.

Dorsal fins separated, fins low, rays flexible; both fins close together; pectoral large, without free rays below, reaching to the origin of anal beyond the vent; ventrals slender, subjugular; anal low, rays weak; caudal elongate, fan-shaped, truncated behind.

Body not scaly, with no bony plates nor prickles; lateral line starts from the upper corner of gill-cleft and runs along the middle of sides reaching to the middle of caudal base.

Colour in formalin brownish gray above, lower part whitish; top of head uniformly grayish while the sides of body maculated with brownish gray; anterior one-third of spinous dorsal fuscus; soft dorsal, pectoral, and caudal pale brown, the latter with several brownish cross bands; ventral and anal whitish.

Described from a specimen of 60 mm. long (No. 1335), collected at the offshore of Niigata.

Remarks; - The present species differs from the type of Genus *Zesticelus* described by GÜNTHER in the year 1887 under the name *Cottus bathybius* obtained in the deep of Pacific of Yede, especially in the size of uppermost preopercular spine and in number of fin rays of dorsal and anal. In addition, having no nasal spine it also differs from the known species of closely allied genus *Porocottus*.

Family *Agonidae*

Genus *Pallasina* CRAMER

6. *Paliasina eryngia* JORDAN & RICHARDSON
Higenaga-Yagiuwo.

Distrib. - Aomori, Echigo; off Kamo.

Genus *Sarritor* CRAMER

7. *Sarritor frenatus* (GILBERT)
Yasetengu-tokubire.

Distrib. - Coast of Alaska; Provostmaya, Kamchatka; Tobishima, Yamagata.

8. *Sarritor leptorhynchus* (GILBERT)
Tengu-tokubire.

Distrib. - Coast of Alaska; recorded off Cape Pestschnuzoff, Korea; off Niigata.

Genus *Podothecus* GILL

9. *Podothecus sachi* (JORDAN & SNYDER)
Tokubire.

Distrib. - Hokkaido to northern part of Japan Sea; east coast of Corea; off Kamo.

Genus *Occa* JORDAN & EVERMANN

10. *Occa dodecaedron* (TILESIUS)
Kamuto-sachiuwo.

Distrib. - Alaska; Kamchatka; Kuril Is.; off Niigata.

Family *Cyclopteridae*

Genus *Cyclopterichthys* STEINDACHNER

11. *Cyclopterichthys ventricosus* (PALLAS)
Hotei-uwo.

Distrib. - Kamchatka; Bering Sea, southward to northern Japan Sea through Hokkaido; off Kamo.

Genus *Cyclolumpus* TANAKA

12. *Cyclolumpus asperrimus* TANAKA
Konpeto.

Distrib. -Off Niigata.

13. *Cyclolumpus birulai* (POPOV)
Hime-konpeto (new name).

Distrib. -Okhotsk Sea; off Otaru; Musashi Bank, northern Japan Sea; Wakkanai; off Kamo, Yamagata.

Genus *Lethotremus* GILBERT

14. *Lethotremus fuscopunctatus* new species
Gomadara-dango (new name).

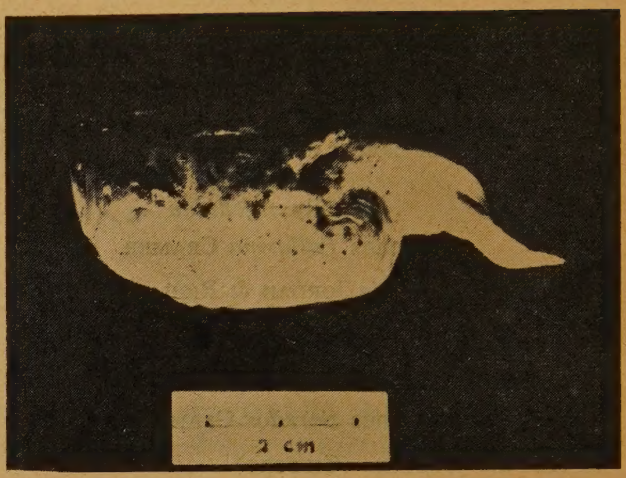

Fig. 2. *Lathotremus fuscopunctatus* OSHIMA Lateral view

Head 2. 34 in length; depth 1.75; depth of caudal peduncle 4. 35 in head; snout 2.67; eye 3.00; interorbital space 1.84; D. V–9; A. 10; P. 25.

Body almost globular, truncated in front; width about equal to depth; the tail short, strongly compressed posteriorly; skin smooth; head large, quadrate anteriorly, slightly vaulted above; snout short; mouth terminal, horizontal; jaws subequal, angle not reaching a vertical through nostril; eye large, lateral and superior, situated much nearer to tip of snout than to gill-opening; preorbital area nearly equal to diameter of pupil; interorbital space extraordinary broad; jaws with broad bands of close-set blunt teeth; barbels none; nostril in a short tube, situated in front of eye above and nearer to lip than to orbit; gill-opening vertical, slit-like, situated about midway between upper edge of the base of pectoral and insertion of spinous dorsal; gill membranes broadly united to isthmus.

Dorsal fins 2, the first inserted behind the gill-cleft above, widely separated from the second, spines short and entirely hidden beneath skin; insertion of second dorsal in advance of that of anal, when depressed scarcely reaching to the base of caudal; pectoral large, rounded posteriorly, its edge continuous; ventral disc round, with a wide free margin, its diameter 1.72 in head ; caudal fan-shaped, truncated behind, fin membrane thin; no lateral line.

Colour in formalin grayish above with brown speckles; ventral side whitish ; all the fins pale with no markings.

Total length 70 mm.

Described from a specimen No. 1345, obtained from the offshore of Niigata.

Remarks: – *Lethotremus awae* JORDAN & SNYDER, hitherto known Japanese species belonging to the present genus greatly differs from the present form in colouration and the shape of head in addition to number of fin rays. Moreover, barbels in head and lower jaw in *L. awae* are not visible and spinous dorsal inserted far behind than the former.

Besides the type another small specimen of 56 mm. long has been examined.

Family *Liparididae*

Genus *Careproctus* KRØYER

15. *Careproctus pellucidus* GILBERT & BURKE
Aobikunin.

Distrib. – Matsushima Bay; off Kamo, Yamagata.

16. *Careproctus sinensis* GILBERT & BURKE
Sekichiku – bikunin.

Distrib. – off Sado.

Genus *Crystallias* JORDAN & SNYDER

17. *Crystallias matsushimae* JORDAN & SNYDER
Abachan.

Distrib. – Matsushima Bay; Saghalien (off Cape Patience) to offshore of Sado and Echigo through northwest end of Hokkaido; Corea.

18. *Crystallias kamoae* new species
Kamo - abachan (new name).

Head 3.76 in length; depth 3.56; snout 2.34 in head; eye 4.40; interorbital space 5.85; D. 60; A. 50; P. 25; C. 10.

Body willow-leaf shaped, elongate, strongly compressed, covered with transparent skin,

Fig. 3. *Crystallias kamoae* OSHIMA

tapering posteriorly; caudal end being acute, deepest at the occipital region; head rather short, top markely convex, dorsal profile nearly straight; interorbital space very slightly convex; mouth inferior, oblique, lower jaw much intruded; maxillary reaches to a vertical through the anterior border of orbit; teeth on both jaws minute, low and trifid; snout short, conical, tip pointed; nostril single, in a long tube, situated nearer to orbit than to tip of snout; both jaws provided with numerous fleshy barbels; eye moderate, directed laterally; gill-openings small, entirely above the base of pectoral; no lateral line.

All the fin rays enveloped in a continuous thin transparent covering; anterior rays of vertical fins scarcely visible; dorsal originates at the end of nape just above gill-opening, the rays becoming higher posteriorly and lessening to the end of caudal; anal inserted somewhat behind the dorsal, similar in shape to the latter; vertical fins continuous to the middle of caudal which is slender, narrow and pointed posteriorly; pectoral large, divided into two parts by a sharrow notch, tip of the fin rays of posterior part extruded from the fin membrane, slender and fringe-like; ventral disc large, entirely covered by the posterior part of pectoral, with free membraneous edge.

Colour in formalin uniformly pinkish white with no markings.

Total length 155 mm.

Remarks: – The present species distinctly differs from the hitherto known species of Genus *Crystallias*, viz. *C. matsushimae* JORDAN & SNYDER, having no bars nor markings on

body and pectoral with fringed posterior part, as well as narrow wedge-like body of nearly straight profile.

A single specimen obtained at the offshore of Kamo; exact locality unknown.

Genus *Liparis* ARTEDI

19. *Liparis tanakae* (GILBERT & BURKE)
Kusauwo.

Distrib. – Japan Sea from Aomori to Noto and Fusan, Corea; Sagami Bay; off Kamo.

Family *Blennidae*

Genus *Stichaeus* REINHARDT

20. *Stichaeus nozawae* JORDAN & SNYDER
Taue-gaji.

Distrib. –Otaru; Hakodate; off Niigata.

21. *Stichaeus elongatus* SAKAMOTO
Nuime-modoki.

Distrib. – Toyama Bay; off Kamo.

Genus *Zestichthys* JORDAN & HUBBS

22. *Zestichthys tanakae* JORDAN & HUBBS
Kanten-genge.

Distrib. – Kushiro, Hokkaido; off Choshi; off Kamo.

Family *Zoarcidae*

Genus *Lycodes* REINHARDT

23. *Lycodes frigidis* COLLLET
Shimofuri-gaji (new name).

Distrib. – northern Atlantic coast of the United States; off Niigata.

24. *Lyoodes japonicus* MATSUBARA
Yamato-gaji (new name).

Distrib. – Toyama Bay; off Niigata.

25. *Lycodes perspicillum* KRφYER
Mayu-gaji.

Distrib. – Greenland; Chipesani, Saghalien; off Kamo.

26. *Lycodes macrolepis* TARANEZ & ANDRIASHEV
Yokoshima-gaji.

Distrib. – Okhotsk Sea; off Kamo.

Fig. 4. *Petroschmidtia toyamensis* KATAYAMA

Genus *Petroschmidtia* TARANEZ & ANDRIASHEV

27. *Petroschmidtia toyamensis* KATAYAMA
Ago-genge.

Distrib. – Toyama Bay; off Tsuiyama, Hyogo Prefecture; off Kamo.

Genus *Furcimanus* JORDAN & EVERMANN

28. *Furcimanus nakamurae* TANAKA
Kuro-genge.

Distrib. – from Hokkaido to northern part of Japan Sea; off Kamo.

Genus *Lycogramma* GILBERT

29. *Lycogramma japonica* new species
Yamato-genge (new name).

Head 6.40 in total length; depth 10.02; snout 3.82 in head; eye 3.54; interorbital space 7.63; D. 92; A. 75; P. 16.

Body elongate, gradually compressed posteriorly, tapering to a point, entirely covered with thin soft membrane; head elongate, skull cavernous; top of occiput broadly depressed; mouth inferior; lower jaw intruded; maxillary reaches to a vertical through anterior border of orbit; villiform teeth banded in both jaws as well as palatines and vomer; outer margin of upper jaw provided with a series of minute canine teeth; nostrils each in a short tube nearer to tip of snout than the eye; tongue short and thick, rounded anteriorly, connected with the floor of lower jaw by means of thin membrane; snout rather short, obtusely rounded anteriorly, provided with irregular concavities corresponding to the caverns of skull; interorbital space deeply depressed, bordered by elevated high ciliary ridges; eye large, superior and lateral, nearer to tip of snout than to eye; gill-openings large, lateral; gill membranes connected to the isthmus; branchiostegals four.

Head except snout minutely scaled; body densely covered with minute imbricated cycloid scales; lateral line none.

Dorsal, anal and caudal continuous, the latter terminating in a sharp point; origin of dorsal a little behind the base of pectoral, middle rays highest, lower anteriorly and posteriorly; origin of anal just behind the vent; its form similar to dorsal, but lower; pectoral rather narrow, pointed, tip scarcely reaches midway to vent; ventral absent:

Colour in formalin plain brownish; fins somewhat paler.

Total length 295 mm.

Remarks: – The present species closely allied to *Lycogrammus zesta* (JORDAN & FOWLER), differing from it in having lesser number of dorsal and anal rays and densely scaled postorbital region of head.

Genus *Gymnelis* REINHARDT

30. *Gymnelis viridis* (FABRICIUS)
Hadaka-genge.

Distrib. – Greenland; Okhotsk Sea; off Niigata.

Genus *Lycodonus* GOODE & BEAN

31. *Lycodonus dorsoscutatus* new species
Hosonaga-genge (new name).

Head 9.40 in total length; depth 13.00; snout 6 in head; eye 3.26; interorbital space 4.50; D. ca. 77; A. ca. 48; P. 18; V. I, 5.

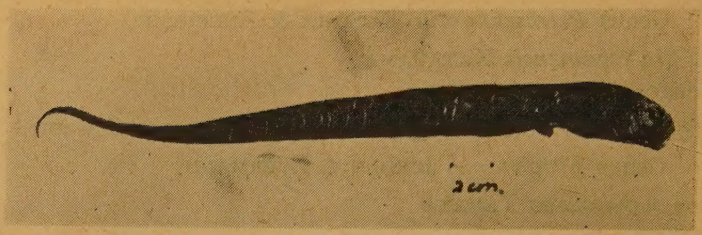

Fig. 5. *Lycodonus dorsascutatus* OSHIMA

Body elongate, strongly compressed, eel-shaped; tapering posteriorly; head rather short, tip more or less convex, dorsal profile slightly arched; mouth oblique, angle reaching beyond the anterior border of orbit below; supramaxillary enormously large, covering the interspace between orbit and upper lip entirely; lower jaw very slightly protruded; bottom of lower jaw remarkably swollen, forming a bag-like projection; teeth on both jaws in a single series, minute and conical; vomer and palatines provided with conical teeth; nostrils two, separated in front of eye above; eye lateral, exceedingly large, small mucous cavities arranged in an arc surround the eye below and behind; horny ciliary ridge low but entire; top of snout with irregularly arranged horny projections; interorbital space rather broad, somewhat depressed; preopercles and opercles flat and smooth, with no tubercles nor spines; gill-openings lateral; gill-membranes not united to the isthmus; branchiostegals four.

Vertical fins not continuous to caudal; origin of dorsal at the upper corner of gill-cleft above, with no spiny rays posteriorly, anterior rays highest, gradually lowering posteriorly, each ray supported laterally by a pair of elongate ectodermal scute; anal inserted just behind the vent, similar in form with the dorsal having no lateral scutes along the base; pectoral rather broad, fan-shaped, outer margin rounded, entire, reaching beyond midway to vent; ventrals jugular, slender, but not rudimental; caudal elongate, ending in a point.

Head entirely naked; body densely covered with minute scales embedded in skin; lateral line obsolete.

Colour in formalin uniformly dark brown; top of head and fins somewhat paler.

Total length 346 mm.

Described from a specimen obtained at the offshore of Kamo, Yamagata Prefecture.

Remarks: – Hitherto known species included in the present genus is *Lycodomus miriabilis* GOODE & BEAN from North Atlantic at the offshore of the United States. The present species widely differs from the above-mentioned species having no lateral supporting scutes of anal rays and lower jaw of peculiar shape, as well as lesser number of anal spines.

List of the Freshwater Fishes Obtained in the South-eastern Kiushiu

Masumitsu OSHIMA, M. A.; D. Sc.

In the following is given the record of the freshwater fishes obtained in the inland-waters of south-easten Kiushiu during the summer of the year 1954–55. The area was limited mainly to Kumamoto and Kagoshima Prefectures where number of species was rather few including no endemic forms. It is remarkable fact, however, that river form of *Oncorhynchus masou*, namely "Yamame," has been discovered in several streams which flow down to Pacific Ocean originating from the interior of mountain regions.

The writer wishes to acknowledge assistance of various staff members of the Fisheries Section of Kumamoto Prefecture, in particular to Mr. Tatsuo FUKUSHIMA and Shiro Saito who helped collection and hearty thanks are shown to Prof. Sadahiko Imai of the Faculty of Fisheries, Kagoshima University, by whose courtesy the writer was able to make an extensive collection throughout Kagoshima Prefecture.

Family *Salmonidae*

Genus *Oncorhynchus* SUCKLEY

1. *Oncorhynchus masou* (BREVOORT). River type
   Yamabe; Yamame.

   Habitat: — Shigase R. at Manganji (upper stream of Tsuetate R. which flows down to Chikugo River.); Kuma R. at Hitoyoshi; Nabeno R. (upper stream of R. Komenotsu); Hamase R. (upper stream of Ōyodo River); Mera R. and Sanzai R. (upper streams of Hitotsuse River).

Family *Plecoglossidae*

Genus *Plecoglossus* TEMMINCK & SCHLEGEL

2. *Plecoglossus altivelis* TEMMINCK & SCHLEGEL
   Ayu.

   Habitat: — Kikuchi R. at Waifu; Midori R. at Namazu; Kuma R. at Hitoyoshi; Sendai R.; Anraku R. at Shibushi; Kimotsuke R. at Kushira.

Family *Siluridae*

Genus *Parasilurus* BLEEKER

3. *Parasilurus asotus* (LINNAEUS)
   Namazu.

   Habitat: — Kikuchi R. at Yamaga.

Family *Bagridae*

Genus *Pseudobagrus* BLEEKER

4. *Pseudobagrus aurantiacus* (TEMMINCK & SCHLEGEL)
   Gigi; Gibachi; Gyu-gyu (Kumamoto).

   Habitat: — Kikuchi R. at Yamaga.

Family *Cyprinodontidae*

Genus *Aplocheilus* McClelland

5. *Aplocheilus latipes* (Temminck & Schlegel)
Medaka.

Habitat: — Kimotsuke River at Kushira.

Family *Cyprinidae*

Genus *Rhodeus* Agassiz

6. *Phodeus smithi* (Regan)
Bara-tanago; Nigabinta (Kumamoto)

Habitat: — Ezu Lake near Kumamoto.

Genus *Acheilognathus* Bleeker

7. *Acheilognathus lanceolatus* (Temminck & Schlegel)
Yari-tanago; Binta (Kumamoto).

Habitat: — Ezu Lake near Kumamoto.

8. *Acheilognathue rhombeus* (Temminck & Schlegel)
Kanehira.; Binta, Enoha-binta (Kumamoto).

Habitat: — Ezu Lake near Kumamoto.

9. *Acheilognathus tabira* Jordan & Thompson
Tabira; Shibinta (Kumamoto).

Habitat: — Kikuchi R. at Yamaga.

10. *Acheilognathus limbata* (Temminck & Schlegel)
Aburabote; Segiri (Yamaga).

Habitat: — Kikuchi River at Yamaga.

Genus *Hemibarbus* Bleeker

11. *Hemibarbus barbus* (Temminck & Schlegel)
Nigoi.

Habitat: — Sendai River.

Genus *Gnathopogon* Bleeker

12. *Gnathopogon gracilis* (Temminck & Schlegel)
Ito-moroko; Dorobae (Kumamoto).

Habitat: — Kikuchi R. at Yamaga.

13. *Gnathopogon caerulescens* (Sauvage)
Hon-moroko.

Habitat: — Ezu Lake near Kumamoto.

Genus *Pseudogobio* Bleeker

14. *Pseudogobio esocinus* (Temminck & Schlegel)
Kamatsuka.

Habitat: — Kikuchi R. at Yamaga; Ezu Lake near Kumamoto; Midori R. at Oshima; Kuma River at Hitoyoshi; Kimotuke R. at Kushira.

Genus *Sarcocheilichthys* Bleeker

15. *Sarcochailichthys variegatus* (Temminck & Schlegel)
Higai, Ishibae (Waifu).

Habitat: — Kikuchi R. at Waifu.

Genus *Pseudorasbora* Bleeker

16. *Pseudorasbora parva* (Temminck & Schlegel)
Motsugo.

Habitat: — Kikuchi R. at Yamaga.

Genus *Tribolodon* Sauvage

17. *Tribolodon hakuensis hakuensis* (Günther)
Ugui; Ida (Kumamoto).

Hibitat: — Shigase R. at Manganji (upper stream of Tsuetate R.),Kikuchi R. at Waifu, Kuma R. at Hitoyoshi.

Genus *Moroco* Jordan & Hubbs

18. *Moroco steindachneri* (Sauvage)
Aburabaya; Aburahaya, Aburabae (Kumamoto).

Habitat: — Shigase R. at Manganji (upper stream of Tsuetate R.); Ezu Lake near Kumamoto; Kuma R. at Hitoyoshi; Anraku R. at Shibushi.

Genus *Zacco* Jordan & Evermann

19. *Zacco platypus* (Temminck & Schlegel)
Oikawa; Akatahae, Asade, Asadehae (male, in Kumamoto); Shirahae, Shrahaya, Shirohae (female, in Kumamoto).

Habitat: — Shigase R. at Manganji (upper stream of Tsuetate R.); Kikuchi R. at Waifu; Tsuetate R. at Tsuetate; Kimotsuke R. at Kushira; Anraku R. at Shibushi; Sendai R.; Midori R. at Oshima; Ezu Lake near Kumamoto; Kuma R. at Hitoyoshi.

Genus *Carassius* Nilsson

20. *Carassius auratus* (Linnaeus)
Funa.

Habitat: — Abundant in streams and rice-fields in everywhere.

Genus *Cyprinus* Linnaeus

21. *Cyprinus carpis* (Linnaeus)
Koi.

Habitat: — Most common in ponds and streams.

Family *Cobitidae*

Genus *Cobitis* (Artedi) Linnaeus

22. *Cobitis Taenia* Linnaeus
Shima-dojō.

Habitat: — Shigase R. at Manganji (upper stream of Tsuetate R.); Midori R. at Oshima; Ezu Lake near Kumamoto.

Genus *Misgurnus* Lacepede.

23. *Misgurnus anguillicaudatus* (Cantor)
Dojō.

Habitat: — Shigase R. at Manganji (upper stream of Tsuetate R.); Kikuchi R. at Yamaga. Most common in rice-fields.

Family *Anguillidae*

Genus *Anguilla* Shaw

24. *Anguilla japonica* Temminck & Schlegel
Unagi.

Habitat: — Ezu R. at Kumamoto. Cultivated in ponds.

Family *Mugilidae*

Genus *Liza* JORDAN & SWAIN

25. *Liza haematocheila* (TEMMINCK & SCHLEGEL)
Menada.

Habitat: — Anraku R. at Shibushi.

Family *Ophicephalidae*

Genus *Ophicephalus* BLOCH

26. *Ophicephalus argus* (CANTOR)
Kamuruchii (Corean name).

Habitat: — Introduced from Corea and Manchuria. Found in Midori River at Oshima and Kimotsuke River at Kushira, Osumi.

Family *Serranidae*

Genus *Bryttosus* JORDAN & SNYDER

27. *Bryttosus kawamebari* (TEMMINCK & SCHLEGEL)
Oyanirami; Seijanbaba (Yamaga).

Habitat: — Kikuchi R. at Yamaga; Midori River.

Family *Cottidae*

Genus *Cottus* (ARTEDI) LINNAEUS

28. *Cottus pollux* GÜNTHER
Kajika.

Habitat: — Midori R. at Oshima.

Family *Gobiidae*

Genus *Eleotris* GRONOW

29. *Eleotris pisonis oxycephala* TEMMINCK & SCHLEGEL
Kawa-anago.

Genus *Mogrunda* GILL

30. *Mogrunda obscura* (TEMMINCK & SDHLEGEL)
Donko.

Habitat: — Tsuetate R. at Tsuetate; Shigase R. at Manganji (upper stream of Tsuetate R.); Kikuchi R. at Yamaga; Kuma R. at Hitoyoshi; Sendai River.

Genus *Gobius* LINNAEUS

31. *Gobius similis* (GILL)
Yoshinobori.

Habitat: — Tsuetate R. at Tsuetate; Kikuchi R. at Yamaga; Midori R. at Oshima.

32. *Gobius giurinus* RUTTER
Gokuraku-haze.

Habitat: — Anraku R. at Shibushi.

Genus *Chaenogobius* GILL

33. *Chaenogobius annularis urotaenia* (HILGENDORF)
Ukigori; Ishikachi (Kumamoto).

Habitat: — Ezu Lake near Kumamoto.

Genus *Tridentiger* GILL

34. *Tridentiger obscurus obscurus* (TEMMINCK & SCHLEGEL)
Chichibu.

Habitat: — Anraku R. at Shibushi.

Genus *Sciopterus* GILL

35. *Sciopterus japonicus* (TANAKA)

Bozu-haze.

Habitat: — Anraku R. at Shibushi.

Notes on the Fishes Collected in the Down Stream of Tama River, with Descriptions of Two New Species

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This is the preliminary report on a collection of fishes obtained in the down stream of Tama River by the efforts of Mr. Kunihiko SHIRAI of the Bureau of Game and Hunting of the Ministry of Agriculture and Forestry. The collection has been very kindly forwarded to the writer for identification.

Among the collection, three species, namely, *Sarcocheilichthys variegatus* (TEMMINCK & SCHLEGEL), *Rhodeus smithi* (REGAN), and *Abbotina pregma* JORDAN & FOWLER, seem to be introduced from the Lake Biwa, mingling with fry of the land-locked "Ayu," *Plecoglossus altivelis* TEMMINCK & SCHLEGEL, large number of which are liberated in the stream evry year. In addition, the fact was found that certain exotic species which have been intentionally or unintentionally transplanted and propagated in the Japanese inland waters, for instance, Manchurian snake-head, *Ophicephalus argus* (CANTOR), is also taking rigid footing in this water. Such being the case, it is important, indeed, to determine which is endemic species or exotic, in order to make sound judgement regarding zoo-geographic problems.

Hearty thanks are due to Mr. SHIRAI who is still continuing the collection to raise the number of unrecorded species in Tama River.

Class Cyclostomata

Family Petromyzontidae

Genus *Lampetra* GRAY

1. *Lampetra reisneri* (DYBOWSKY) Sunayatsume
   A single specimen, of 120 mm long.
   Distrib.—Almost all parts of Japan including Hokkaido.

Class Pisces

Famiry Plecoglossidae

Genus *Plecoglossus* TEMMINCK & SCHLEGEL

2. *Plecoglossus altivelis* TEMMINCK & SCHLEGEL Ayu
   3 specimens.
   Distrib.—Streams of all parts of Japan, including Hokkaido and Okinawa; Corea, China and Formosa.

Family Cyprinodontidae

Genus *Aplocheilus* MCCLELLAND

3. *Aplocheilus latipes* (TEMMINCK & SCHLEGEL) Medaka
   2 specimens.
   Distrib.—Rice-fields and pools of Japan, Okinawa, Corea, China and Formosa.

Family Siluridae

Genus *Parasilurus* Bleeker

4. *Parasilurus asotus* (Linnaeus) Namazu

A single specimen.

Distrib.—Most common in Japan proper; Corea, Manchuria; China; Formosa.

Family Bagridae

Genus *Aoria* Jordan

5. *Aoria aurantiacus* (Temminck & Schlegel) Gigi, Gibachi; Gebachi (at Tamagawa)

A single specimen.

Distrib.—North of Hakone except Aomori Prefecture, to south western part of Kiushu.

Family Cyprinidae

Genus *Rhodeus* Agassiz

6. *Rhodeus smithi* (Regan) Baratanago; Nigabinta (Ezu-lake Kumamoto)

Five specimens (probably introduced from Lake Biwa).

Distrib.—Abundant in Kasumigaura; common in western part of Honshu and Kiushu.

Genus *Acheilognathus* Bleeker

7. *Acheilognathus lanceolatus* (Temminck & Schlegel). Yaritanago; Binta (Kumamoto)

A single specimen.

Distrib.—Common in Japan proper except Aomori Prefecture and Hokkaido.

Genus *Hemibarbus* Bleeker

8. *Hemibarbus barbus* (Temminck & Schlegel) Nigoi; Migoi; Soi; Sai (Lake Biwa); Goi (Shinano); Seizo, Saizo, Saita (Tamagawa)

A single specimen.

Distrib.—Common in Japan proper except Hokkaido.

Genus *Pseudogobio* Bleeker

9. *Pseudogobio esocinus* (Temminck & Schlegel) Kamatsuka

14 specimens.

Distrib.—Japan proper except Hokkaido; Corea; Manchuria.

Genus *Sarcocheilichthys* Bleeker

10. *Sarcocheilichthys variegatus* (Temminck & Schlegel) Higai; Sakurabae; Meaka; Ishibae (Kumamoto)

3 specimens (probably introduced from Laka Biwa).

Distrib.—Proper habitats are the west of Toyohashi. Artificially propagated to various parts of Japan proper at present.

Genus *Abbottina* Jordan & Fowler

11. *Abbottina psegma* Jordan & Fowler Tsuchifuki; Doromoroko; Sunamoroko; Dorougui

2 specimens.

Distrib.—Tributaries of Yodo River; Okayama; Yanagawa.

Genus *Pungtungia* Herzenstein

12. *Pungtungia shiraii* sp. nov. Shirai-mugitsuku (new name)

Head 3, 20 in length; depth 4, 70; depth of caudal peduncle 3, 16 in head; eye 4, 75; snout 2, 72; interorbital space 3, 80; pectoral 1, 90; ventral 2, 10; D. II, 7; A. 2, 5; P. 18; V. 9; pharyngeal teeth 4-4; scales 6-46-9.

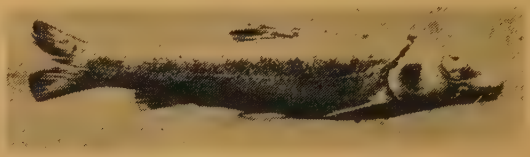

Fig. 1. *Pungtungia shiraii* sp. nov.

Body elongate, oblong and compressed; head large, elongate, conical, upper and lower profiles nearly straight; snout long, pointed anteriorly; eye moderate, superior and in the middle of head; mouth rather small, oblique and subinferior, its angle not reaching a vertical through front edge of anterior nostril; lips thin and fleshy; one pair of short maxillary barbel near the angle of mouth; edge of the mandible rounded, not horny; pharhyngeal teeth slender, high and pointed; nostrils close together, in front of eye, much nearer to orbit than tip of snout, interorbital space broad and flat, boundary between the post-nasal space distinctly depressed; gill-openings moderate; gill-rakers rudimentary, short and few in number; pseudobranchiae present.

Scales cycloid, thin and minute, not imbricated; pectoral and ventral flaps present.

Origin of dorsal much nearer to tip of snout than the base of caudal, 2nd. ray the longest, somewhat spiny, when depressed the tip of the fin does not reach the origin of anal, base of the fin 2, 10 in head, outer margin slightly concave; anal inserted midway between origin of ventral and base of caudal, the fin rather short, outer margin nearly straight; caudal elongate and deeply emarginate, tips of both lobes sharply pointed; pectorals short, reaching about two-thirds the distance to origin of ventrals; ventrals inserted a little before posterior end of the dorsal; anus one scale before the origin ofanal; lateral line nearly straight, running along the middle of sides, anterior portion slightly decurved.

Colour in formalin pale gray above, paler and whitish below, top of head and snout uniformly gray; back indistinctly maculated with black; a longitudinal series of irregular black spots along the lateral line above; dorsal and anal uniformly gray, outer margin of the former blackish; the rest of the fin whitish.

Total length 74 mm.

Described from a specimen collected in Tama River near Denyenchofu in May, 1952.

Remarks.—The present species differs from *Pungtungia hilgen-dorfi* chiefly in having different formulae of pharyngeal teeth and number of scales. Colouration also differs markedly having no broad lateral band of deep brown along the lateral line.

Genus *Biwia* Jordan & Fowler

13. *Biwia tama* sp. nov. Tamabaya (new name)

Head 4,45 in length; depth 4,45; snout 3 in head; eye 4,50; interorbital space 3; depth of caudal peduncle 1,93; pectoral 1,50; ventral 1,50; D. 2,7; A. 1,6; P. 16; V. 9; scales in lateral line 43; 5 scales between origin of doral and lateral line, 5 scales between the latter and the middle of belly; pharyngeal teeth 4-4.

Fig. 2. *Biwia tama* sp. nov.

Body elongate, compressed, broadest at the insertion of dorsal; caudal peduncle rather deep; head rather small; snout blunt and rounded, median anterior part of nostrils markedly depressed; eye moderate, high and anterior; nostrils close together, in front of eye above; mouth small, terminal, slightly oblique, upper jaw longer than the lower, angle scarcely reaching a vertical through anterior edge of anterior nostril; lips thick and fleshy, the broad suborbitals overlapping the angle of mouth on each side, anterior part of the lower jaw exposed; no barbels; interorbital space broad and convex, with a median longitudinal depression which extends forwards to the depression on the top of snout; gill-openings moderate, gill-rakers on the first arch few and small, 2+4; pseudobranchiae present; pharyngeal teeth one-rowed, rather high and compressed with distinctly hooked tip.

Origin of dorsal nearer to tip of snout than the base of caudal, anterior ray the longest, 1,28 in head, the base of the fin 1,50, outer margin of the fin nearly straight; anal originated well behind the tip of depressed dorsal, rather short, anterior ray the longest, 1,80 in head, outer margin of the fin nearly straight; caudal bifurcate, tip of each lobe pointed; pectorals rather short, nearly as long as ventrals, extending a little beyond the midway to ventrals; ventrals inserted beneath the middle of the base of dorsal.

Scales large, cycloid, imbricated, of more or less even size; no scales on breast; pectoral and ventral flaps present; lateral line at almost straight, very slightly decurved anteriorly.

Colour in formalin brownish gray above, paler and whitish below; sides maculated with dark brown; dorsal and caudal gray, tip of the former whitish, a black broad streak starts at the anterior threefifths of the fin, running obliquely backwards staining three anterior developed rays; pectoral gray; ventral and anal whitish.

Total length 122 mm.

Described from a specimen collected at Denyenchofu in May, 1952.

Remarks.—Hitherto known species included in the genus *Biwia* JORDAN & FOWLER is *Biwia zezera* (ISHIKAWA) known from Lake Biwa, Gifu, Nagoya and Asahi River,

Okayama. The present species differs distinctly from the former in having 43 scales in the lateral line and 4-4 pharyngeal teeth instead of 5-5. At present a single specimen has been obtained in the type locality.

Genus *Pseudorasbora* Bleeker

14. *Pseudorasbora parva* (Temminck & Schlegel) Motsugo; Kuchiboso; Ishimoroko
13 specimens.
Distrib.—Common in Japan proper; Corea; Manchuria; China, Formosa.

Genus *Tribolodon* Sauvage

15. *Tribolodon hakuensis hakuensis* (Günther) Ugui; Eda; Akahara; Haya Maruta, Marutahaya (Tamagawa)
7 specimens of moderate size.
Distrib.—Common in Japan, including Hokkaido; Amur Provinces; Sakhalin; Corea.

Genus *Zacco* Jordan & Evermann

16. *Zacco platypus* (Temminck & Schlegel) Oikawa; Haya; Shirahaya; Yamabe, Jinjinbaya, Kusareppaya (Tamagawa)
10 specimens.
Distrib.—Most common in streams of Japan proper extending to Corea, China and Formosa.

Genus *Carassius* (Linnaeus)

17. *Carassius auratus* (Linnaeus) Funa
10 young specimens.
Distrib.—Most common in streams, rice-fields, pools throughout the country. Rather cosmopolitan.

Family Cobitidae

Genus *Misgurnus* Lacépède

18. *Misgurnus anguilicaudatus* (Cantor) Dojo
A single specimen.
Distrib.—Most common in rice-fields in Japan proper, Corea, China, and Formosa, extending to India.

Genus *Cobitis* (Artedi) Linnaeus

19. *Cobitis taenia* Linnaeus Shima-dojo; Yanagi-dojo (Tamagawa); Ajime-dojo; Takanoha-dojo; Sasa-dojo; Tsurumaki-dojo; Kuruma-dojo
6 specimens.
Distrib.—Common in Japan proper except Hokkaido

Family Anguillidae

Genus *Anguilla* Shaw

20. *Anguilla japonica* Temminck & Schlegel Unagi
A single specimen.
Distrib.—Throughout Japan proper; Corea, China, Formosa.

Family Mugillidae

Genus *Mugil* (Artedi) Linnaeus

21. *Mugil cephalus* LINNAEUS Bora

A single specimen (young form).

Distrib.—Common in Japanese waters. Young forms enter into estuaries.

Family Ophicephalidae

Genus *Ophicephalus* BLOCH

22. *Ophicephalus argus* (CANTOR) Rai (Corean Snake-head)

A single specimen.

Distrib.—Propagated in main streams and lakes in Japan proper being accidentally transplanted from Corea and Manchuria.

Family Gobiidae

Genus *Gobius* LINNAEUS

23. *Gobius giurinus* RUTTER Yoshinobori; Gori

Distrib.—Common in streams of Shikoku and Kiushu and in Lake Biwa. Abundant. Distributed in Corea, China and Formosa.

Genus *Tridentigier* GILL

24. *Tridentiger obscurus* (TEMMINCK & SCHLEGEL) Chichibu; Torahaze

5 specimens.

Distrib.—From Hokkaido to Okinawa, entering into estuaries and down streams.

Genus *Acanthogobius* GILL

25. *Acanthogobius flavimanus* (TEMMINCK & SCHLEGEL) Mahaze

6 specimens.

Distrib.—Common in brackish waters south to Aomori, extending to Corea and China.

キチヌ稚魚の形態その他に就いて*

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Notes on the Young of the Black Porgy, *Mylio latus* (HOUTTUIN)

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緒　　言

キチヌ *Mylio latus* (HOUTTUIN) は種々の点でクロダイ *Mylio macrocephalus* (BASILEWSKY) と類似して居り[1]，その市場価値もクロダイの味の落ちる夏に多少区別される以外は一般に（養殖の面でも）クロダイと同一に取扱われていて，その為もあつてか特に本種に関する調査研究は甚だ少い。

但しクロダイの産卵期が春である[2)3)]のに対し，本種は秋[2)]に産卵する点に最も著しい生態的相異があり，この点より晩秋に採集される本種の稚魚を汽水池に放養する事は池の利用の点からも又クロダイの養殖種苗の確保に安全性を増す点からも有意義である。又その成長についても生後満一年のものの大きさはクロダイのそれに比してやや大きいようであり**，従つて養殖の対象としての利点もあるのでこれが生態を明かにする事は興味深いことと思われる。

筆者は三河湾，浜名湖で採集される材料について研究を進めているが，本種の成長，年齢，性現象等に関しては，別に報告する事にしてここにはその稚魚の形態及びその他について観察した二，三の点について報告したい。御指導を賜つた大島泰雄教授並びに中村中六助教授に厚く御礼申し上げる。

稚魚の採集

1954 年 11 月 25 日～12 月 9 日の間，満潮時に愛知県渥美郡福江湾岸（養殖池水門）に於て昼間及び夜間（灯火を用いて）手網で掬い取つた。各採集時（計 7 回）の水温は 8.7～17.2°C，塩分量は Cl 14.12～16.41‰ の範囲であり，採集尾数は 269 尾である。その体長範囲は 10.7～14.5 mm で 12 mm 前後のものが多く，何れも各鰭の棘，軟条の定数 (D.f. XII～XIII, 13. A.f. III, 8) が現われた稚魚期のものである。採集の際稚魚は数尾乃至数十尾の群をなして水の表面近くを遊泳して寄つてくるが，此のような現象はクロダイやヘダイの稚魚には見受けられない性質のように思われる。猶，湾内藻場に於ける稚魚の採集については既に詳細な報告があり[4)]，又同地方汽水池の一部には 10 月末頃より稚魚が見られる。

体形，色彩及び斑紋

既に報告されている他のタイ類の稚魚[5)6)7)]と同様に，本稚魚も成魚に比べて眼が大きく体が細長い特徴を有している。而して成長（飼育による）に従い体長に対する体高の割合は次第に大きくなり，成魚の体形に近くなる (Fig. 1)。例えば Table 1 に示すように，体長 10.7 mm の個

* 1955 年 4 月　日本水産学会年次大会に於て口頭発表。
** 8 月に於ける最小個体群（無輪）は 10.6～15.1 cm であつた（浜名湖，52 尾）。

Table 1. The ratio of body length to body height in various sizes of the young.

Number of specimens	Body length (mm)	Total length (mm)	Body height (mm)	B.L./B.H. (average)
1	10.7	12.8	2.7	3.96
2	11.3	13.6—13.7	3.0—3.2	3.65
3	11.8	14.1—14.2	3.2—3.4	3.54
3	12.3	14.8—14.9	3.7—3.8	3.29
2	12.9	15.1—15.3	3.9	3.31
2	13.9	16.8—16.9	4.3—4.6	3.13
1	14.5	17.8	5.0	2.90
1	16.8	21.9	6.2	2.71
1	18.8	23.3	7.2	2.61
1	22.2	27.0	8.7	2.55
1	25.3	31.8	10.2	2.48

体に於けるその値は約4であるが，25.3 mm の個体では約 2.5 となり成魚に於ける値の 1.9～2.5[1] に近似してくる。猶頭部の眼上前部の輪郭線の角度は体長 23.8 mm の個体で約 155° を示して居り，成魚の 150～160° と変らない。

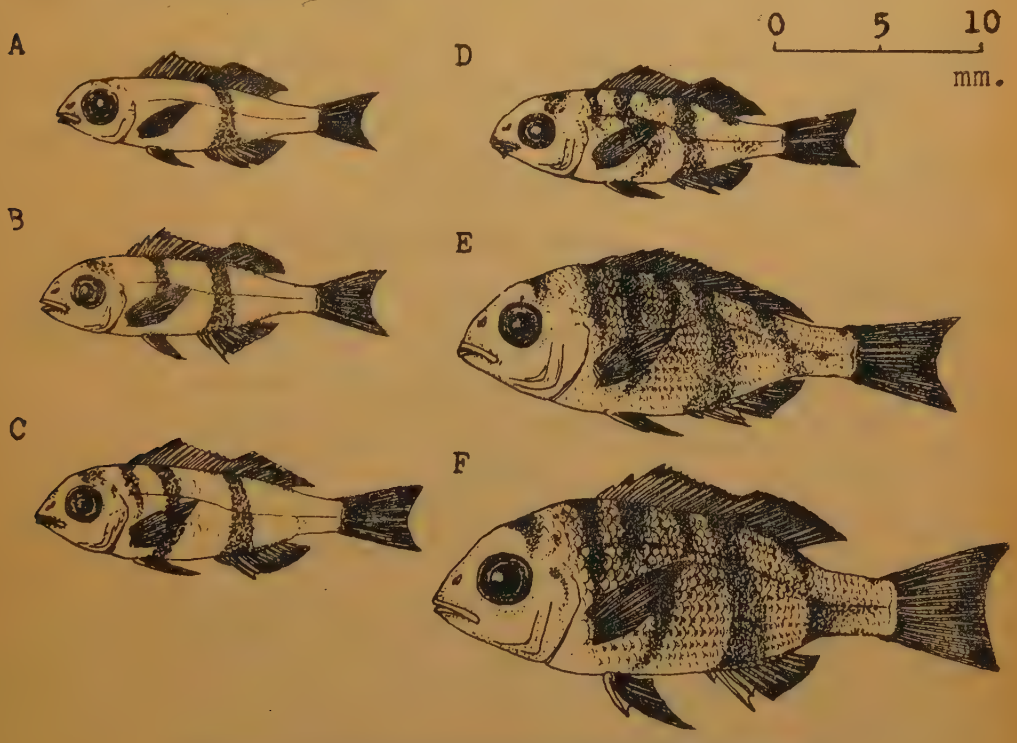

Fig. 1. The changes of body form and horizontal patterns with the growth of the young.

地色は初めは殆ど無色で透明の状態であるが，次第に灰褐色を帯びる様になり背面より腹面に至るに従つて淡くなつている。これは鱗の発達に伴つてその色素胞の増加によるものであるが，成長するにつれて頭部，胴部及び尾部に稚魚期特有の黒褐色の横縞が次第に表われてくる。即ち体長 11～12 mm 位のものでは Fig. 3 の A に示すように背鰭の第1～第4軟条の基底部から臀鰭基部にわたつて幅広い1横縞があるのみであるが，次に背鰭の第4～第6，7棘の基底部よ

Table 2. The measurements of the young described in Fig. 1.

No.	Total length (mm)	Body length (mm)	Length of head (mm)	Length of snout (mm)	Diameter of orbit (mm)	Body height (mm) the begin. of D.f.	Body height (mm) the begin. of A.f.
A	14.0	12.1	3.5	1.3	1.5	3.3	3.1
B	15.2	12.7	3.9	1.4	1.6	3.9	3.2
C	16.9	13.9	4.2	1.3	1.9	4.6	4.0
D	16.8	14.0	4.6	1.4	1.9	4.5	3.9
E	23.3	18.8	6.3	1.8	2.5	7.2	6.6
F	27.0	22.2	7.3	2.0	3.0	8.7	7.8

り腹面腹鰭基底の後部にかけて横縞が表われ，又頭部眼上後方に黒褐色の色素が多くなり次第に横縞状となる (Fig. 1, B)。次いで背鰭の前部背面～第1棘基底部より腹側に伸びる横縞が形成され，殆ど同時に背鰭軟条後半部下方に色素が濃くなり，側線部及び下部に生じた斑点と共にやや不鮮明な横帯となる (Fig. 1, C, D)。更に背鰭の第9～第11棘基底部及び背鰭基部の末端からも下方に向つて横縞が表われるがこれ等は余り判然としない (Fig. 1, E, F)。以上の如く本稚魚に於ては，頭部に1条，胴部に3条，尾部に2条（尾柄部の1条は巾広く不鮮明）の黒褐色の横縞が次第に表われてくる*。而して鱗の成長に伴つてその露出面の中央部分が次第に暗褐色を帯びるようになり，それが連つて多くの縦条として表われてくるが，更に成魚では此の縦条のみが強く出て，稚魚期に明瞭な上記横条紋は薄れてくる。キチヌの特徴である腹鰭及び臀鰭の棘部から軟条先端部にわたる黄色の発現は，斯かる稚魚では未だに認められず，臀鰭第2棘の肥大が僅かに目立つ程度である。尾鰭も特に色彩はないが背鰭の第3～第5棘間膜と更に後部軟条膜辺縁に黒色斑点が表われ，次第に背鰭の全辺縁を黒色でふちどるようになる。

低塩分に対する抵抗性

次に本種稚魚の汚水池養殖種苗としての適性を知るため，先づ低塩分水に対する抵抗性について観察して見た。供試魚は体長 11.7～14.8 mm (平均 13.04) のもので，実験前 10 日間 Cl

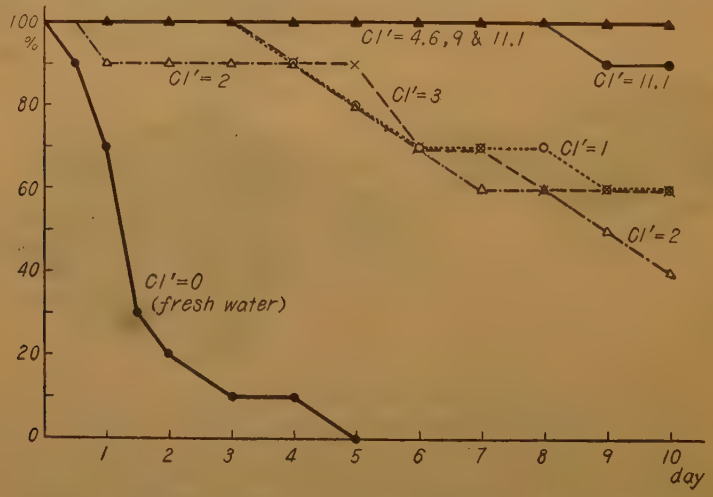

Fig. 2. Relation between the salinity of water and the survival rate of the young, fed on mysid shrimp at a water temperature range between 8.6–12.1°C.

* 6) には8条と記載されている。クロダイは8条前後。

12‰ の内湾水で飼育したものである。各供試水は海水を沪過天水により適当に稀釈して調整し，餌料としてミヂンコを適時投与して，12 日間飼育を行い，各 10 尾宛の生残率をみた。期間中の水温は 8.6～12.0°C である。その結果は Fig. 2 に示す通りである。即ち淡水では 2 日間で大半が死に 5 日間で全滅し，又 Cl 3‰ 以下では相当数の死亡個体が見られるが，Cl 4‰ 以上ではその為の障害は特に認められない。

低温時の摂餌量その他

恒温槽を使用して本稚魚の各水温特に低温時に於ける摂餌状態及び適応の限界等の観察を行った。摂餌試験は供試魚 4 尾を，A—体長 20.3, 21.2 mm，体重 0.23, 0.29 g，B—19.0, 20.8 mm, 0.19, 0.26 g の 2 組に頒けて行い，餌料としてニホンアミの体長 5～8 mm のものを投与した。20, 15, 10, 5°C の各段階について順次に行つたが，夫々 3～5 日間の馴化期間を置いて後引き続き 7 日間の摂餌量を測定した。飼育水の Cl′ は 12.4～16.2‰ である。その結果は魚体の大きいA組の方がB組より常に僅か乍ら多く餌を摂つて居り，水温の低下に伴う摂餌量の減少について両者は全く同様の傾向を示しているので，その平均より供試魚の 1 尾当りの日間摂餌

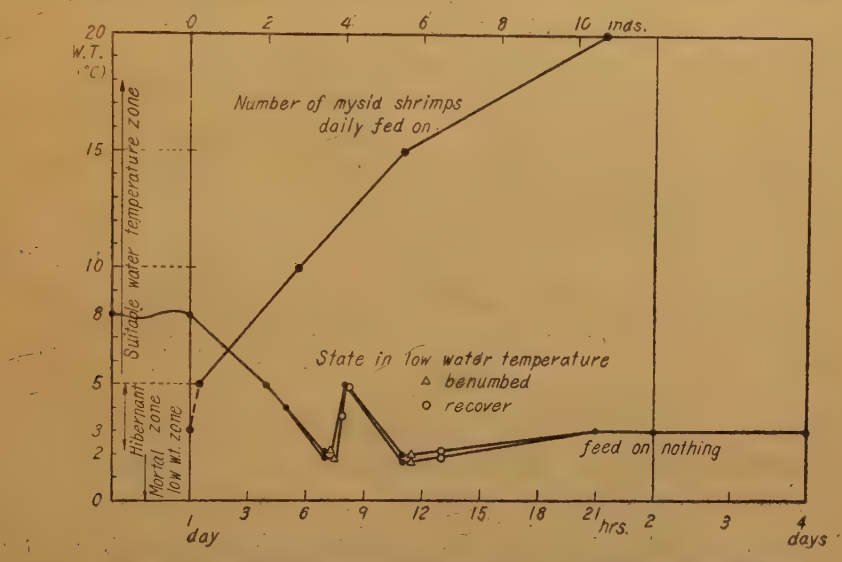

Fig. 3. Relation between the daily rate of feeding of the young and low water temperature.

量を求めると，Fig. 3 の上部に示す通りである。即ちその平均日間摂餌量は，アミ尾数にして，水温 20°C で 10.7，15°C で 5.5，10°C で 2.8 と次第に減少し，更に 5°C では 0.3 になり摂餌しない状態となる。而して 20°C に於ける摂餌率$\left(\frac{\text{日間摂餌量}}{\text{魚体重}}\right)$は，アミ 10.7 尾が約 0.05g であるから 21% 前後という事になる。

次にAの 2 尾を用いて水温 8°C に 1 日間飼育した後，約 1 時間に 1°C の割合で水温を低下させてその反応を観た (Fig. 3)。水温の低下に従つて運動が不活潑となるが，2°C 前後に於て不安状態となり，やがて (15～30 分後) 横転し，所謂寒冷麻痺の状態を示すようになる。温度を 5°C 迄上昇させると恢復し，不活潑な遊泳状態ではあるが安定する。又水温 3°C では全く餌を摂らないから長期の生存は不可能なものと思われる。因みに本魚の越冬の見られる前記の汽水池に於ける冬季の自記水温記録 (1954～1955) をみると，日間最低水温が 4.6°C の時が 1 回あるのみで他は 5°C 以上である。

終りに本稚魚を養殖種苗として考える際に重要な点は，採捕量の多少という点であるが，詳細は不明であるので将来に於て明かにしたい。

摘　　要

1.　キチヌの稚魚期（B.L. 10.7～25.3 mm）に於ける成長に伴う体形，斑紋等の変化を観察し，体高に対する体長の割合の減少，及び横縞の増加について記載した。

2.　キチヌ稚魚を養殖種苗とする観点から次の如き基礎資料を求めた。

（1）　低塩分水に対する抵抗性については，塩分量 Cl 4‰ 以上の場合は特にその為の影響が認められず，死亡個体が見られなかつた。

（2）　ニホンアミを餌料とした場合，その日間摂餌率は 20°C に於て，約 21% であり，低水温になるに従つて減少（15，10°C に於て夫々約半減）し，5°C 及びそれ以下に於ては餌料を摂らなかつた。而して 2°C 前後に於て横転（寒冷麻痺）するようになつた。

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Résumé

The "kichinu" or "kibire," *Mylio latus* (Houttuin), and the "kurodai," *Mylio macrocephalus* (Basilewsky), are regarded as the same fish for commercial purposes, because these two varieties of the black porgy look very like, show similar geographical distributions and are equally prized as food fish. They differ, however, in various biological characteristics, of which the spawning season is most noteworthy. While *Mylio macrocephalus* spawns in spring, *Mylio latus* spawns in autumn. This suggests the possibility that a new type of fish culture may be developed for brackish waters, in which the young of *Mylio latus* are stocked in brackish fish ponds in autumn and raised to marketable size by the end of next autumn.

The author carried out some morphological and ecological studies on the young of *Mylio latus* collected in Fukue Bay, Aichi Pref. in order to get informations necessary for such type of fish culture. The results obtained are as follows:

1. In the young of body lengths 10.7–25.3 mm, the ratio of body length to body height become smaller with the growth of the fish, i. e., the body form gradually approaches to that of the adult fish. At the same time, the horizontal patterns on the body side increase in number from one to six.

2. Young "kichinu" were reared in the water of low chlorinities, and their

survival rate was recorded (Fig. 2). The lower limit of the chlorinity harmless to these fish was about 4‰.

3. When fed with the mysid shrimp, young "kichinu" daily took about 21% as much shrimp as their own body weight at the water temperature of 20°C. The lower the temperature became, the less food they took. At temperatures below 5°C they did not take food. They lay down on their side when exposed to the low temperature of about 2°C for 30 minutes.

The Callous Pad of the Pharyngeal Masticatory Apparatus in Indian Carps

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Introduction

It is a well-known fact that the pharyngeal teeth together with the callous (cornified or horny) pad constitute an efficient masticatory apparatus in carps. The subject of pharyngeal teeth has been studied quite extensively both from the taxonomic and evolutionary standpoints but little is known of the structure of callous pad. The literature reveals short accounts in the communications on the alimentary tract of fish by ROGICK (1931), CURRY (1939), AL-HUSSAINI (1949) and GIRGIS (1952).

The purpose of the present study is to extend the range of observations on the callous pad in Indian carps to synthesize the earlier viewpoints. The fishes under report are *Catla catla* (HAM.) and *Barbus stigma* (C. & V.) which were collected from their natural environs and fixed in Bouin's fluid. Material was sectioned 6–8 μ thick and sections were stained with Delafield's haematoxylin and eosin.

It is a pleasure to pay tribute to Dr. M. L. BHATIA, Professor of Zoology, University of Delhi, for his stimulating interest and indispensible guidance. The author wishes to record his cordial thanks for the kind permission, given by the Fisheries Development Adviser, Ministry of Agriculture, Government of India, to publish this paper. The work was accomplished at the Department of Zoology, University of Delhi, while the author held a Senior Research Training Scholarship, instituted by the Ministry of Education, Government of India, which is gratefully acknowledged.

Morphology and histoloy of the callous pad

Morphology:—The callous pad in *Catla catla* and *Barbus stigma* (Plate I, Figs. a, b) is borne on the masticatory process of the basioccipital bone of the skull. It forms the dorsal surface of the pharyngeal dental apparatus against which the pharyngeal teeth work and crush the food before it enters the oesophagus.

ROGICK (1931) mentions that the posterior pharynx in *Campostoma anomalum* includes the region of the ventral pharyngeal teeth and a dorsal callous pad. CURRY (1939) reports in the carp, *Cyprinus carpio communis* that a small cornified hard triangular structure is found dorsal to the pharyngeal teeth. The base of the triangle is anterior. AL-HUSSAINI (1949) describes that a horny pad is developed in the dorsal wall of the pharynx below the occipital region of the skull opposite to the pharyngeal teeth. In *Rutilus rutilus* this is more or less ovoid in plan; in *Cyprinus carpio* it is similar to that of *Rutilus rutilus* but even harder; and in *Gobio gobio* the pad is trapezoidal in plan, not so well-developed and is much softer. GIRGIS (1952) states

Plate I

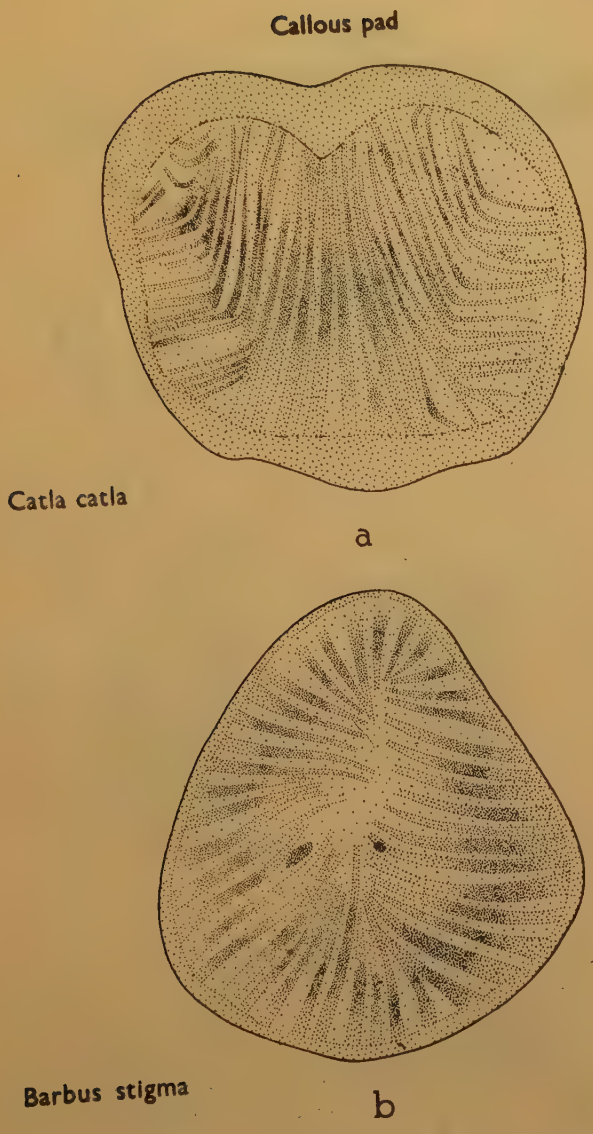

Fig. a. Callous pad of *Catla catla*. ×40.

Fig. b. Callous pad of *Barbus stigma*. ×40.

Plate II

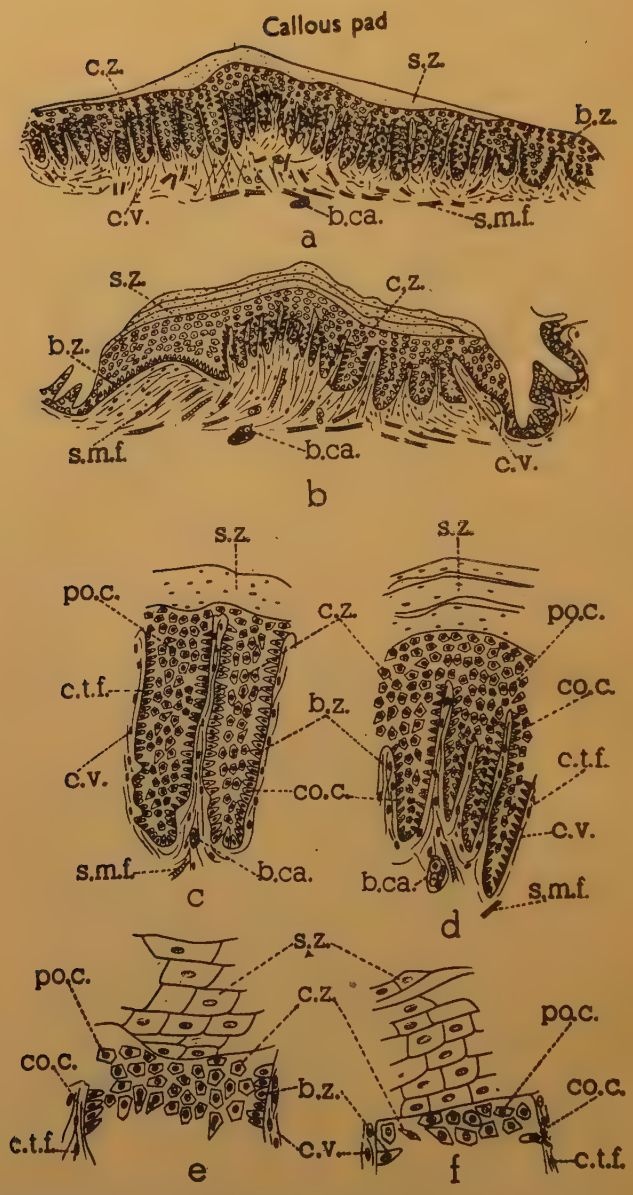

Fig. a. A transverse section passing through the callous pad of *Catla catla*. ×40.
Fig. b. A transverse section passing through the callous pad of *Barbus stigma*. ×40.
Fig. c. A part of the transverse section passing through the callous pad of *Catla catla*. ×120.
Fig. d. A part of the transverse section passing through the callous pad of *Barbus stigma*. ×120.
Fig. e. The different zones of the callous pad of *Catla catla*. ×315.
Fig. f. The different zones of the callous pad of *Barbus stigma*. ×315.

b. ca., blood capillary; *b. z.*, basal zone; *c. t. f.*, connective tissue fibres; *c. v.*, cutis vera; *c. z.*, central zone; *co. c.*, columnar cell; *po. c.*, polygonal cell; *s. m. f.*, striated muscle fibres; *s. z.*, superficial zone.

that the roof the posterior pharynx is formed of an extremely hard cornified structure which rests on a ventral extension of the basioccipital.

Histology:—Four distinct zones which constitute the callous pad of *Catla catla* are: the superficial zone or the stratum corneum, the central zone or rete mucosum, the basal zone and the supporting zone or cutis vera (Plate II, Figs. a, c, e).

The superficial zone is thick and has very closely-set polygonal cells which give the appearance of strips of cells. The nuclei in these cells are in different states of degeneration and are seen only after a careful focussing of the section. This zone is easily identified owing to its affinity of taking deep eosin stain in contrast with other zones. It has greatest thickness in the middle region and the whole zone assumes an attenuated form. The central zone is bigger than other zones and is recognized by folds which are large in the centre than on the sides. The folds consist of distinct polygonal cells, each with a centrally-situated big round or oval nucleus. Bridges are clearly seen between each cell. Towards the periphery of the folds the cells are of the columnar type and form the basal zone. Cutis vera is the supporting layer of the pad and is composed of irregularly disposed connective tissue fibres which run also in between the folds. Muscle fibres of striated type are present and the zone has an abundant vascular supply.

The callous pad in *Barbus stigma* consists of the same zones as described in *Catla catla* (Plate II, Figs. b, d, f). The superficial zone is an horny layer and is composed of three sheets joined together with some ground substance which takes deep stain with eosin. The sheets have polygonal flat cells, with nuclei in various phases of disintegration and are not sharply differentiated and distinct. The central zone is folded and is packed with polygonal cells. The intercellular clefts or bridges are distinct. The deepest cells, set on the surface of cutis vera, are columnar, forming the basal zone. The cutis vera is a stratum of dense fibrous connective tissue with striated muscle fibres and blood capillaries in it.

Discussion:—Rogick (1931), in a very concise description (unaccompanied with figure) on the roof of posterior pharynx in *Campostoma anomalum,* mentions an extremely thick layer of desquamating cells on the pad. The cells of the pad are very large, polygonal and show frequent intercellular cytoplasmic bridges. Extremely slender mucosal folds penetrate halfway up the pad. Curry (1939) describes in the cornified pad of *Cyprinus carpio communis* a layer of cornified cells which are enucleate, a stratum of disintegrating cells, a layer of living cells and the connective tissue folds. The intercellular bridges between large polygonal cells are distinguishable. The epithelial cells next to the connective tissue folds form a single layer of columnar cells resting on a basement membrane. Striated muscle bundles are found at the base of the pad. Al-Hussaini (1949) divides the structure of the horny pad of *Cyprinus carpio, Rutilus rutilus* and *Gobio gobio* into three zones: the superficial, the middle and the basal. The staining reactions of superficial zone are those characteristic of horn; the cells have thick membranes, irregular outline and the nuclei are retained but in a very degenerate condition and the cells are shed from the surface either singly or in groups. The

middle zone comprises large polygonal cells, with clearly visible fine cytoplasmic bridges. The basal zone consists of a single layer of columnar cells following the sinuosities of the tunica propria. Numerous striated muscle fibres are found at the base of the pad which presumably would be capable of effecting some adjustment of its position. GIRGIS (1952) states that the epithelium of the pad of *Labeo horie* is composed of distinct zones which react differently to stains. The superficial zone (stratum corneum) contains cells with very irregular outline, some cells contain disintegrating nuclei while others are enucleate. Apparently cornification of the pad serves to produce the solid surface necessary for mastication. At or near the surface layer the degree of disintegration of nucleus varies in each cell. Protoplasmic bridges between large polygonal cells are distinguishable and some cells exhibit mitotic figures. The basal layer is made up of large columnar cells, which rest on a basement membrane, lined by the areolar connective tissue papillae.

Considering the histological details given above it is evident that observations on the callous pad of *Catla catla* and *Barbus stigma* are in harmony with those of AL-HUSSAINI (1949). It may be epitomized that, in the callous pad, the nuclei in the cells of the superficial zone are found in a very degenerate condition; large polygonal cells (a few with mitotic stages) of the middle zone have fine bridges and the basal zone is of columnar cells. Striated muscle fibres occur in the cutis vera. In *Labeo horie* (GIRGIS, 1952) the cells with disintegrating nuclei are observed among completely cornified enucleate cells all over the pad. In this it differs from *Cyprinus carpio communis* (CURRY, 1939) where the nucleated cells form the bottom layers of stratum corneum and the enucleate cells form the top layers but it is in accordance with the observations made by AL-HUSSAINI (1949) on the horny pad of carps. Desquamation of cells takes place at the surface.

AL-HUSSAINI (1949) has remarked on the basis of an histological examination of the horny pad of the mirror carp, *Cyprinus carpio* (herbivorous), the roach, *Rutilus rutilus* (omnivorous) and the gudgeon, *Gobio gobio* (carnivorous) that the hardness of the pad is in direct proportion to the thickness of superficial zone, being greatest in the herbivorous and least in the carnivorous fish. The author adheres to an opinion that an elaborate study on the structure of callous pad in carps with different food and feeding habits is essential before deducing any inference.

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東北地方深海産魚類の稀種. II.

Melamphaës 属 (*Melamphaidae* 科) の 1 稀種

丸山圭石
(東北海区水産研究所八戸支所)

Rare deep-water fishes from off Tōhoku and adjacent regions. II.

Record of a rare species of the genus *Melamphaes* (family *Melamphaidae*)

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(Hachinohe Branch Laboratory, Tohoku Regional Fisheries Research Laboratory)

本属魚類は NORMAN (1929), PARR (1931 及び 1933) によつて詳しく研究され, PARR は先に NORMAN が同定した世界産 14 既知種に更に 4 種を加えて, 18 既知種とした。これら 18 既知種の中には北太平洋産種として *Melamphaës cristiceps, M. lugubris, M. nigrofulvus, M. mizolepis, M. bispinosus* 等が主として米国カリホルニア沖合から知られている。然しながら本邦近海からは未だその分布が明らかにされていない。最近筆者は本所々属試験船第一旭丸 (56 噸) 並に漁船第十神海丸 (51.6噸) が 1951 年 7 月～10月, 二艘曳機船底曳網による東北近海の深海漁場 (水深 500～1000 m) 調査で採集した魚類標本を検して, 本属魚類を発見し, 本邦近海の分布を確認した。

本研究に当り文献の閲読に特別の便宜と御指導を賜わつた東海区水産研究所阿部宗明博士, 本所支所長浜井生三博士, 東北大学山本護太郎博士に, 又標本採集に尽力された第一旭丸石橋正船長, 調査に従事された諸氏に対して深堪なる感謝の意を表する。

Melamphaës cristiceps GILBERT Fig. 1

カブトウオ (新種)

背鰭Ⅲ棘 12～13 軟条, 臀鰭Ⅰ棘 9～10 軟条, 胸鰭 14 軟条, 腹鰭Ⅰ棘 7 軟条, 第 1 鰓弓上の鰓耙数 7～9+17?～21。

体各部の割合は次に示す通りである。体長 (尾鰭を除く) は体高の 3.50～3.72 倍, 頭長の 2.48～2.59 倍, 吻端から背鰭起部までの 2.08～2.19 倍, 尾柄長の 3.58～3.86 倍。頭長は吻長の 4.34～4.75 倍, 眼径の 6.91～7.80 倍, 両眼間隔の 2.82～3.25 倍, 上顎長の 2.29～2.52 倍, 背鰭基底長の 1.46～1.50 倍, 臀鰭基底長の 3.00～3.46 倍, 胸鰭長の 1.18～1.24 倍, 吻長は眼径の 1.45～1.70 倍。両眼間隔は眼径の 2.40～2.46 倍。背鰭起部から尾鰭基底までの距離は背鰭起部より吻端までの距離の 1.11～1.23 倍, 背鰭最後鰭条の位置は臀鰭最後鰭条の位置より前にあつて, その中央垂直面を遙かに超す (略 6～7 軟条の上)。臀鰭起部の位置は背鰭後半分下 (略 6 軟条下) にある。臀鰭起部から吻端までの距離は臀鰭起部から尾鰭基底までの距離の 1.68～1.75 倍。胸鰭は長く臀鰭の中央上部に達する。腹鰭は短かく胸鰭基底下に位置している。尾柄長は尾柄高の 2.12～2.29 倍。

Fig. 1. *Melamphaës cristiceps* GILBERT from off Kesennuma, Miyagi Pref. Body length (without caudal fin) 96.5 mm.

体は延長側扁し，容貌はかいいで特徴があり，鼻孔間吻の中央上部に強い1棘を持つ。頭は大きく，厚く，骨質の隆起と窪みに富む。頭頂両眼間上には1対の骨質にして薄く縁辺不規則なる鋸歯状を呈する冠状突起をもち，その縁辺部は外側に曲る。又この冠状突起の下側，眼窩と鼻孔周辺にも，即ち眼窩の上部から鼻孔の前縁を廻り，眼窩の下側を経て眼窩の後縁をふちどる縁辺鋸歯状を呈する骨質様の隆起がある。この他にも各上顎骨上と各下顎骨下に各々薄い骨板様の隆起をもち，下顎骨下のものはその直下と体の正中線上とにあつて，後者は両側のものが対をなし頭部従走竜骨を形成している。鰓蓋前骨の隆起は下側の部分程強く，下隅には斜後方に突出した2或は3棘をもつている。この棘より上方の縁に 4～7 本，前方下縁に 3～4 本の小棘がある。尚この隆起部より後方縁上に弱々しい約10条の隆起をもち，又その下方縁上には約15条の隆起をもち，共にその尖端はとび出して棘状をなしている。鰓蓋主骨は薄く，上部には2つに分岐した隆起をもち，その間には弱々しい1群（約8条）の隆起があつて，これらの尖端もやはり棘状をなしている。鰓蓋下骨の下側は半円状を呈し，やはり弱々しい約 10 条の隆起をもち，又鰓蓋間骨にも約 10 条の起隆があつて共にその尖端は棘状をなしている。口は適度に斜に裂け，上顎主骨は眼の後縁に達するか或は少し超えている。歯は小さく，絨毛状で両顎上1列に並ぶ鋤骨と口蓋骨には歯がない。鰓は4個で，鰓耙は細長く，側扁し，その内側左右両面には細長い小棘が疎生する。偽鰓は非常に小さい。鱗は脱落性で大きく薄く，円形，輪紋は同心円状。1縦列の鱗数は25枚余を数う。体色（ホルマリン漬）は紫黒色で眼窩周辺並びに頭部上面は薄紫色を呈し，鱗の脱落した跡は帯黄褐色を呈す。又口内及び鰓腔壁面は黒色を呈す。

本記載は体長（尾鰭を除く）96.5～98.5 mm の次の4標本によつた。

1.	(96.5 mm)	昭和26年7月27日	気仙沼沖合	底曳漁区234区	水深 850 m
2～3.	(98.5, 97.5 mm)	昭和26年8月4日	久慈沖合	底曳漁区198区	水深 600 m
4.	(97.5 mm)	昭和26年7月24日	金華山沖合	底曳漁区259区	水深 600 m…頭部破損

分布　大西洋，北米太平洋岸，北日本太平洋岸

附記。NORMAN の記載では体長は体高の 3.75～3.84 倍，頭長の 2.60～2.66 倍で，頭長は眼径の 7.0～8.5 倍，吻長の 4～4.5 倍，両眼間隔の 3.25～3.50 倍で，胸鰭長は頭長の 0.66 倍，

そして尾柄長は尾柄高の 2.5～2.66 倍で，筆者の標本は此等の点でその範囲を幾らか超える。然し GARMAN, PARR の記載では体長は体高の 3.5 倍 (GARMAN), 3.71 倍 (PARR), 頭長の 2.4 倍 (GARMAN), 2.44 倍 (PARR), 頭長は吻長の 3.9 倍 (PARR), 両眼間隔の 3 倍 (GARMAN), 3.16 倍 (PARR) で，これ等の点では殆んどよく一致をみるし，又その他の点でもよく一致する。

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Résumé

The fishes of genus *Melamphaës* were studied in detail by NORMAN (1929) and PARR (1931, 1933). PARR added four species to the fourteen species reported by NORMAN. There are known *Melamphaës cristiseps*, *M. luguburis*, *M. nigrofulvous*, *M. mizolepis* and *M. biopinosus* etc. out of eighteen known species from the North Pacific (mainly off the coast of California, U. S. A). But these species seem not to have been recorded from Japanese waters.

Recently I have examined the specimens of deep-water fishes gathered by our office's resarch boat, No. 1 Asahi-maru (56 ton), and chartered boat, No. 10 Shinkai-maru (51.6 ton) during investigation of deep-water fishing grounds (500–1000 meters depth) in bottom trawl without otter boards inTôhoku and adjacent region during July～October, 1951, and made sure the occurrence in Japanese waters of one species *M. cristiceps* GILBERT (new Japanese name Kabuto-uo) of this genus. Four specimens were collected and they were each almost of the same body length, from 96.5 mm to 98.5 mm in length without caudal fin. Collected date, location and depth are as follows.

1. (96.5 mm) 27 July 1951, off Kesennuma, Miyagi Pref., trawl fishing ground 234. Depth 850 m.
2–3. (98.5, 97.5 mm) 4 Aug. 1951, off Kuji, Iwate Pref., trawl fishing ground 198. Depth 600 m.
4. (97.5 mm) 24 July 1951, off Kinkazan Miyagi Pref., trawl fishing ground 259. Depth 600 m. Bad condition.

Body proportions of these specimens were somewhat beyond upper or lower limit of NORMAN's description, but well agree with GAMAN's and PARR's description.

New, Rare or Uncommon Fishes from Japanese. VI. Notes on the Rare Fishes of the Family *Histiopteridae*

Tokiharu ABE

(Tokaiku Suisan Kenkyujo, and Zool. Inst., Fac. Sci., Univ. Tokyo)

A. "Kusakari-tsubodai",* *Pseudopentaceros richardsoni* (SMITH) from near Tokyo. On May 1, 1957, the writer found some 40 kilograms of *Pseudopentaceros richardsoni* (SMITH) at a middleman's shop at the Central Wholesale Market of Tokyo. The fish were undoubtedly shipped from a nearby village, probably from southern part of Bôsô Peninsula (south of Tokyo). They were of about the same size, measuring some 340–390 mm in total length and weighing some 1 kilogram. The writer purchased four specimens, and two ladies from the Women's College of Dietetics who accompained him bought three. The skeleton of the two of the latter specimens have been presented for study to the writer. This species seems to be very rare in Japanese waters, and believed to have been unrecorded there. The specimens mentioned above agree fairly well with the description and figure by A. SMITH, 1849 (Illustrations of the zoology of South Africa; consisting chiefly of figures and descriptions of the objects of natural history collected during an expedition into the interior of South Africa, in the years 1834, 1835, and 1836; fitted out by "The Cape of Good Hope Association for Exploring Central Africa". Pisces, plate 21, description on two pages). Just a century later, Prof. J. L. B. SMITH, 1949 (2nd print, 1950) (The sea fishes of South Africa, p. 242) stated for the present species that "Known mainly from a few specimens taken off New Zealand, though the original type was found at Cape Point before 1845. None since found here. Specimens wanted"; and for the family *Histiopteridae* he stated that "Rather curious fishes of southern seas, mostly from deep water, everywhere rare, seldom seen. Flesh excellent, but all specimens should be preserved..."

Description of an adult example (*Cat. No. ABE '57-125*). Collected at the Central Wholesale Market of Tokyo; data given above. Total length (from tip of lower jaw) 340 mm, fork length (from tip of lower jaw) 332 mm, standard length (from tip of upper jaw to hind end of vertebral column) 286 mm. The following measurements are given in hundredths of the standard length: Greatest depth of body (at ventral origin) 41.3, greatest breadth of body (at ventral origin) 17.5, least depth of caudal peduncle 9.3,

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* This new Japanese name means Mr. T. KUSAKARI's "Tsubo-dai" (*Quinquarius japonicus*). A few years ago, he kindly presented to the writer for study a fine specimen of *Pseudopentaceros richardsoni* taken at Hachijō Island. In addition, some examples representing young stages of the fishes of *Hitiopteridae* have been sent to the writer from the island by Mr. KUSAKARI and Mrs. T. SHIGETA. The writer takes pleasure in giving a new Japanese name to *Pseudopentaceros richardsoni* after Mr. KUSAKARI, member of staff at the Hachijō Branch Station, Fisheries Experiment Station of Tokyo Prefecture. The writer wishes here to express his sincere thanks to Mr. KUSAKARI and Mrs. SHIGETA for co-operation.

lenth of head 32.5, horizontal diameter of orbit 8.7 on both sides, vertical diameter of orbit 8.2 on both sides, length of snou 11.5 (left) & 11.9 (right), bony interorbital breadth above eye-centers 11.5, distance between outer margins of ventral origins 10.2, length of longest (3rd) dorsal spine 16.1, length of longest (1st) soft dorsal fin-ray 12.1, length of longest (4th) anal spine 10.5, length of longest (1st) anal soft fin-ray 12.1, length of longest (5th on left side; 4th–6th on right side) pectoral fin-rays 29.0 (left) & 29.4 (right), length of left ventral spine 19.4 (right spine damaged), length of longest (outermost) ventral soft fin-ray 19.4 on both sides, length of longest (uppermost of lower limb) gill-raker on 1st arch 2.8–3.1 on both sides.

In general appearance, and more especially in general tint prior to preservation, this specimen resembles the adult of *Plectorhyhchus cinctus* (Temminck & Schlegel), and the shape and squamation of the belly reminds the writer of *Xenocyttus nemotoi* Abe. The bony surafce of the head reminds him further of the young of *Chaedontina*.

The body is compressed and deep. The caudal fin is slightly emarginate. The dorsal profile of the head and the nape is nearly straight, slightly concave behind the nostrils; the interorbital area is broad and very gently convex; the nape up to the dorsal origin is weakly carinate. The surface of the head appears to be bony excepting for the upper part of the preoperculum and operculum, cheek below sub-orbitals, lips, maxillary, anterior end of snout, narrow area surrounding nostrils and about half of the lower jaw; the two fomer parts have scales. The uncovered head bones and those of the pectoral girdle are finely striated (or rugose) and somewhat rough to touch.

The under surface of the body from the ventral origins (which are placed fairly far back from the pectoral bases) forward is nearly flat, and triangular. This triangular space is much narrower than long, and not well delimited anteriorly. This space is covered by hard juxtaposed scales which form mosaic. From between the ventral origins backward to the vent, the mid-ventral part of the belly is feebly keeled, and covered by hard, quandrangular, or pentagonal or hexagonal scales as in preventral area.

The pectoral and ventral fins are fairly long, but the latter do not reach the vent. The length of the ventral spine and that of the outermost soft fin-ray of the fin on each side are nearly equal to (or, slightly less than) the distance from the anterior margin of the pupil to the hind margin of the operculum. The length of the pectoral fin on each side is a little more than the distance from the anterior nostril to the hind margin of the operculum.

The dorsal spines are received in a fairly wide, longitudinal, furrow. The 1st spine, which is much shorter than the others, is in the mid-dorsal line; the 2nd and the succeeding spines are not rooted in the mid-dorsal line; the 2nd spine originates from a point just behind the 1st and slightly left to the mid-dorsal line, and, when depressed, fits to the left margin of the 1st and 3rd spines. The 3rd spine originates from a point slightly right to the mid-dorsal line, and more or less inclined to the left, thus, when laid down, fits to the right side of the 2nd and 4th spines, the latter of which, in turn, originating from left side of the mid-dorsal line, is inclined to the right. The

same holds true with the successive spines. As in *Quiquarius capensis* (SMITH, 1951, pp. 875 & 878) the 3rd and a few subsequent dorsal spines each have proximally an anterior lobate projection.

In the anal fin also the spines are received in a groove. The 1st spine (the shortest of all the anal spines) is in the mid-ventral line; the 2nd, as in the 2nd dorsal spine, originates from a point slightly left to the mid-ventral line and inclined to the right, thus, when laid down, fitting to the left margin of the 1st and 3rd spines; the 3rd spine originates from a point slightly right to the mid-ventral line, directed to the left, and, when all the spines are laid down, its fore margin fits to the hind margin of the 1st spine, and its hind margin fits to the right margin of the 4th spine which is in the mid-ventral line. The dorsal and anal soft fin-rays are covered basally by scaled skin. Otherwise these fins are scaleless.

The basal part of the pectoral fin on each side is scaled.

The caudal fin is scaled basally, and the membranes between the fin-rays are proximally scared; otherwise the fin is scaleless.

The lateral line is strongly arched anteriorly; almost parallel to the dorsal profil of the body below the 5th–11th dorsal spines, then descending gradually to a point below the 2nd or 3rd soft dorsal fin-ray, and becomes nearly straight on the side of the caudal peduncle.

The nostrils are paired on each side; the anterior one is placed nearly midway between the snout tip and the fore margin of the eye, and provided with a raised skinny projection along its hind margin; the posterior nostril is placed just behind and dorsally to the anterior, eliptical in shape (whereas the anterior is rounded), and its long diameter is a little greater than the diameter of the anterior nostril. The distance between the inner margin of each anterior nostril is slightly less than 1/2 of the horizontal diameter of the orbit and equal to the distance between the hind margin of the posterior nostril and the fore margin of the orbit where a conpicuous soft groove delimits the upper edge of the preorbital.

There are 3 pairs of small pores along the anterior part of the lower jaw, of which the anteriormost pair are rather inconspicuous. These chin pores remind the writer of *Hapalogenys*.

The hind margin of the preoperculum is nearly perpendicular to the longitudinal axis of the body, very weakly and broadly produced at the lowermost part, and provided with very low denticulations which are the hind ends of the striae of the bone.

D. XIII–I–9 (or XIV 9) (all soft fin-rays branched; 9th ray bifid to base; 8th and 9th rays slightly close together, but the morjority of observers may not regard these as one ray). A. IV 7 (all soft fin-rays branched; 7th ray bifid to base; 6th and 7th rays slightly close together, but may not be regarded as one ray). P. 17 (=ii+14+i) on both sides. V. I 5 (all soft fin-rays branched). C. 8+7 (principal branched fin-rays only have been counted; for rudimentary fin-rays, see notes on the other specimens which follow).

The scales of the flank and the dorsal part of the body are imbriacate, arranged

fairly regularly; they are cycloid, the exposed part being rugose. Each of these scales bear a whitsh spot near the center. The number of the pored scales in the lateral line is somewhat difficult to count exactly, but *ca.* 68 (left) and *ca.* 69 are countable back to the hindmost pored scale on the skin covering the caudal base. The number of the slightly oblique vertical scale rows just below the lateral line is 44 (left) and 46 (right) between the top of its anterior arch and its turning point above the 3rd or 4th anal spine. The number of the scales above the lateral line is somewhat difficult to count exactly because of the smaller, and irregularly arranged scales near the dorsal margin of the body; and, furthermore, near the dorsal origin are found very small scales rendering the exact counting in ordinary method almost impossible. Fortunately, however, the number of the scales of the nape can be counted fairly exactly; the number of the scales in an oblique row from the scale just behind the hind end of the occipital superficial bone to the scale just above the anterior part of the lateral line is 20 (left) and 23 (right); the number of the scales in an oblique row from the edge of the groove receiving the dorsal spines down to the one just above the lateral line is 7–9 near the 7th spine (the counting is made easier when started, contrary to the ordinary method, from top down and forward). The scaly part of the cheek is wider anteriorly; at the anteriormost part the number of the scales counted from top downward is *ca.* 6 or 7 on both sides. The number of the scales just in front of the upper corner of the preoperculum is only 6 or 7 on each side, and that of the scales above the operculum is also only *ca.* 7 on each side. The scales on the ventral part of the body are juxtaposed, pentagonal or hexagonal in outline, thick and hard, bearing radiating striae. The size of these scales varies considerably, and the larger scales have each a central dark colored pit-like depression, which corresponds to the central elevation in each of the scales of the other parts of the body.

The inner fold of the left branchiostegal membrane laps over the right one*. The number of the branchiostegals is 4+3 on both sides. The pseudobranchiae are well developed. Gills are four in number, and there is a conspicuous slit behind the 4th gill-arch. The gill-rakers on the 1st arch are stout and rather short; their number is 7+1+17 on both sides. The tongue is broad proximally, but pointed at the anterior end.

Teeth are present only on the jaws and vomer. The jaw teeth are very fine and sharp, forming a band on each jaw. There is a narrow edentulous area at the symphysis. The vomerine teeth are also very small, and forms a small patch on the head of the bone.

The lips and chin are villous. The membranous fold just inside of the upper jaw is well developed as in *Decapterus*, and whitish. The mouth, prior to preservation, is more or less protrusible.

Notes on the other examples (*Cat. Nos. Abe '57–126*; *'57–127*; *'57–128*; *57–130*; *'57–131*). All collected along with the example described above. Total length 374–

* In other specimens, the right membrane laps over the left.

390 mm, fork length 364–378 mm, standard length (measured from the snout tip to the hind end of the vertebral column) 313–325 mm. Three specimens (ABE '57–128, '57–130, '57–131) have been skeletonized. Total number of vertebrae 25 (=12+13) (counting the hindmost segment as 1) in all three specimens. The 3rd proximal dorsal radial (interneural) is much wider than the 1st and 2nd which bear no dorsal spines, keeled laterally and inserted between the neural spines of the 2nd and 3rd vertebrae. There are 2 proximal dorsal radials between the neural spines of the 3rd and 4th vertebrae. Between each of the pairs of the successive neural spines is only a single proximal dorsal radial for the support of a dorsal spine. The hindmost proximal dorsal radial is placed just above the tip of the neural spine of the 18th vertebra in the three specimens. The number of the proximal dorsal radials is 2+21+i in one specimen and, with the exception of the anteriormost and hindmost radials which were not counted exactly, the number is the same for the other two specimens. The distal segments of the dorsal radials are well developed for the spinous portion of the fin, the posteriorly projecting horn of each segment fitting to the small tunnel at the root of the dorsal spine just behind; the anteriormost is inserted between the 2nd and 3rd dorsal spines, and the successive distal radial segments increase in size, forming dorsally concave depression between the dorsal spines. The distal segments of the dorsal radials for the soft fin-rays are cartilaginous, rounded, each being clipped by the roots of the left and right halves of each fin-ray.

The number of the proximal segments of the anal radials (interhaemals) is 9 in one specimen, and 10 in two specimens. The anteriormost segment is placed in front of the haemal spine of the 13th vertebra and bears the 1st and 2nd anal spines in the three specimens, and the hindmost is just in front of the haemal spine of the 18th vertebra. The distal segments of the anal radials are absent for the 1st and 2nd spines; the 3rd and 4th anal spines have each a bony distal segment of the radial just infront of the base, where a small tunnel recevies a posteriorly projecting horn of the distal segment. The distal segments of the anal radials for the soft fin-rays are more or less rounded, and clipped by the bases of left and right halves of each fin-ray.

The number of the caudal fin-rays is vii/8/7/vii in one specimen, viii/8/7/vii in one specimen and viii/8/7/vi+x in one specimen.

The structure of the hindmost and penultimate vertebrae is somewhat complicated; the antriormost ventral element of the hindmost vertebra has a fairly strong postero-dorsally projecting spine at its postero-dorsal corner on each side; there are three free neural elements between the neural spine of the antepenultimate vertebra and the urostyle; there are three fairly broad, nearly triangular, fan-like, flattened bones between the latter and the anteriormost ventral element of the hindmost vertebra mentioned above; furthermore, in one specimen, there are two small bones just below the ventral end of the haemal spine of the penultimate vertebra. *(to be concluded)*

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